Name: Date:

Polynomial Factoring solution (version 660)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 + 4x + 31 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(4) \pm \sqrt{(4)^2 - 4(1)(31)}}{2(1)}$$

$$x = \frac{-(4) \pm \sqrt{16 - 124}}{2(1)}$$

$$x = \frac{-4 \pm \sqrt{-108}}{2}$$

$$x = \frac{-4 \pm \sqrt{-36 \cdot 3}}{2}$$

$$x = \frac{-4 \pm 6\sqrt{3}\, i}{2}$$

$$x = -2 \pm 3\sqrt{3}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $-2 + 8i$ and $-7 - 5i$ in standard form $(a + bi)$.**

Solution

$$(-2 + 8i) \cdot (-7 - 5i)$$

$$14 + 10i - 56i - 40i^2$$

$$14 + 10i - 56i + 40$$

$$14 + 40 + 10i - 56i$$

$$54 - 46i$$

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3. **Write function $f(x) = x^3 + 7x^2 + 4x - 12$ in factored form. I'll give you a hint: one factor is $(x + 2)$.**

Solution

	1	7	4	-12
-2		-2	-10	12
	1	5	-6	0

$$f(x) = (x + 2)(x^2 + 5x - 6)$$

$$f(x) = (x + 2)(x - 1)(x + 6)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = -(x + 4)^2 \cdot (x + 1)^2 \cdot (x - 2)^2 \cdot (x - 5)$$

Sketch a graph of polynomial $y = p(x)$.